

WHAT IS CLAIMED IS:

1. A hybrid vehicle that outputs power to a drive shaft linked with drive wheels, said hybrid vehicle comprising:

an internal combustion engine;

5 an electric power-dynamic power input-output module that transmits at least part of power from said internal combustion engine to said drive shaft through input and output of electric power and dynamic power;

a motor that inputs and outputs power from and to said
10 drive shaft;

an electric accumulator that transmits electric power to and from said electric power-dynamic power input-output module and said motor; and

a controller that, in response to a driver's
15 accelerator-off action to require a driving force demand to said drive shaft subsequent to the driver's accelerator-on action, sets a specific drive point of said internal combustion engine to attain output of a driving force corresponding to the driving force demand to said drive shaft, based on the
20 driving force demand and a discharge limit of said electric accumulator, and controls said internal combustion engine, said electric power-dynamic power input-output module, and said motor to drive said internal combustion engine at the

preset specific drive point and to ensure output of the driving force corresponding to the driving force demand to said drive shaft.

2. A hybrid vehicle in accordance with claim 1, wherein
5 said controller calculates a first revolution speed of said internal combustion engine from a smoothed driving force, which is obtained by smoothing the driving force demand, and the discharge limit of said electric accumulator, and sets the calculated first revolution speed to a target revolution speed
10 of said internal combustion engine at the specific drive point.

3. A hybrid vehicle in accordance with claim 2, wherein said controller sets the smaller between the first revolution speed and a second revolution speed to the target revolution speed of said internal combustion engine at the specific drive
15 point, where the second revolution speed is obtained by smoothing a revolution speed of said internal combustion engine calculated from the driving force demand.

4. A hybrid vehicle in accordance with claim 2, wherein said controller sets the first revolution speed calculated from
20 a first driving force, which is transmitted to said drive shaft through input and output of power from and to said electric power-dynamic power input-output module, to the target revolution speed of said internal combustion engine at the

specific drive point, where the first driving force is obtained according to a specific relation that a sum of the first driving force and a second driving force, which is input and output between said motor and said drive shaft, is equal to the
5 smoothed driving force obtained by smoothing the driving force demand and according to another specific relation that a sum of a first electric power input from and output to said electric power-dynamic power input-output module and a second electric power input from and output to said motor is equal to the
10 discharge limit of said electric accumulator.

5. A hybrid vehicle in accordance with claim 4, wherein said controller substitutes a power input from and output to said electric power-dynamic power input-output module, which is calculated from the first driving force, into a target power
15 of a relational expression, reversely calculates the relational expression to specify a target revolution speed, and sets the specified target revolution speed to the first revolution speed of said internal combustion engine, where the relational expression determines a target power to be input
20 from and output to said electric power-dynamic power input-output module in feedback control of said electric power-dynamic power input-output module with the setting of the target revolution speed of said internal combustion engine.

6. A hybrid vehicle in accordance with claim 2, wherein said controller drives and controls said electric power-dynamic power input-output module under a driving condition specified to drive said internal combustion engine at the preset specific drive point, while driving and controlling said motor to output a specific driving force to said drive shaft, where the specific driving force corresponds to a difference between a driving force applied to said drive shaft by the actuation and the control of said electric power-dynamic power input-output module and the smoothed driving force obtained by smoothing the driving force demand in response to the driver's accelerator-off action.

7. A hybrid vehicle in accordance with claim 6, wherein said controller drives and controls said motor under restriction of the discharge limit of said electric accumulator.

8. A hybrid vehicle in accordance with claim 1, wherein said electric power-dynamic power input-output module comprises:

a three-shaft power input-output assembly that is connected with three shafts, that is, an output shaft of said internal combustion engine, said drive shaft, and a third shaft, and specifies input and output of power from and to one residual

shaft among said three shafts, based on powers input from and output to two shafts among said three shafts; and

a generator that inputs and outputs power from and to said third shaft.

5 9. A hybrid vehicle in accordance with claim 1, wherein said electric power-dynamic power input-output module is a pair-rotor motor, which comprises a first rotor linked with an output shaft of said internal combustion engine and a second rotor linked with said drive shaft and outputs at least part
10 of the power from said internal combustion engine to said drive shaft accompanied with input and output of electric power generated through an electromagnetic interaction between said first rotor and said second rotor.

10. A hybrid vehicle controlling method for a hybrid
15 vehicle, said hybrid vehicle comprising: an internal combustion engine; an electric power-dynamic power input-output module that transmits at least part of power from said internal combustion engine to a drive shaft linked with drive wheels through input and output of electric power and
20 dynamic power; a motor that inputs and outputs power from and to said drive shaft; and an electric accumulator that transmits electric power to and from said electric power-dynamic power input-output module and said motor, said hybrid vehicle

controlling method comprising the steps of:

(a) in response to a driver's accelerator-off action to require a driving force demand to said drive shaft subsequent to the driver's accelerator-on action, setting a specific drive
5 point of said internal combustion engine to attain output of a driving force corresponding to the driving force demand to said drive shaft, based on the driving force demand and a discharge limit of said electric accumulator; and

(b) controlling said internal combustion engine, said
10 electric power-dynamic power input-output module, and said motor to drive said internal combustion engine at the preset specific drive point and to ensure output of the driving force corresponding to the driving force demand to said drive shaft.

11. A hybrid vehicle controlling method in accordance
15 with claim 10, wherein said step(a) calculates a first revolution speed of said internal combustion engine from a smoothed driving force, which is obtained by smoothing the driving force demand, and the discharge limit of said electric accumulator, and sets the calculated first revolution speed
20 to a target revolution speed of said internal combustion engine at the specific drive point.

12. A hybrid vehicle controlling method in accordance with claim 11, wherein said step(a) sets the smaller between

the first revolution speed and a second revolution speed to the target revolution speed of said internal combustion engine at the specific drive point, where the second revolution speed is obtained by smoothing a revolution speed of said internal combustion engine calculated from the driving force demand.

13. A hybrid vehicle controlling method in accordance with claim 11, wherein said step(a) sets the first revolution speed calculated from a first driving force, which is transmitted to said drive shaft through input and output of power from and to said electric power-dynamic power input-output module, to the target revolution speed of said internal combustion engine at the specific drive point, where the first driving force is obtained according to a specific relation that a sum of the first driving force and a second driving force, which is input and output between said motor and said drive shaft, is equal to the smoothed driving force obtained by smoothing the driving force demand and according to another specific relation that a sum of a first electric power input from and output to said electric power-dynamic power input-output module and a second electric power input from and output to said motor is equal to the discharge limit of said electric accumulator.

14. A hybrid vehicle controlling method in accordance

with claim 13, wherein said step(a) substitutes a power input from and output to said electric power-dynamic power input-output module, which is calculated from the first driving force, into a target power of a relational expression,

5 reversely calculates the relational expression to specify a target revolution speed, and sets the specified target revolution speed to the first revolution speed of said internal combustion engine, where the relational expression determines a target power to be input from and output to said electric

10 power-dynamic power input-output module in feedback control of said electric power-dynamic power input-output module with the setting of the target revolution speed of said internal combustion engine.

15 15. A hybrid vehicle controlling method in accordance with claim 11, wherein said step(b) drives and controls said electric power-dynamic power input-output module under a driving condition specified to drive said internal combustion engine at the preset specific drive point, while driving and controlling said motor to output a specific driving force to

20 said drive shaft, where the specific driving force corresponds to a difference between a driving force applied to said drive shaft by the actuation and the control of said electric power-dynamic power input-output module and the smoothed

driving force obtained by smoothing the driving force demand in response to the driver's accelerator-off action.

16. A hybrid vehicle controlling method in accordance with claim 15, wherein said step(b) drives and controls said
5 motor under restriction of the discharge limit of said electric accumulator.